CALIFORNIA STATE DEPARTMENT OF PUBLIC HEALTH
GILES S. PORTER, M.D., Director

Weekly Bulletin

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Early History of Malaria in California

Several references to the presence of malaria in California before the gold rush which began in 1849 are available. Medical men attached to United States military expeditions in 1841 and again in 1846 have reported the presence of intermittent fever in members of their own forces and in the native Indians of the "Great Valley of the Sacramento." In a special edition of the San Francisco *Star* of April, 1848, Dr. V. J. Fourgeau, a most capable physician of that day, wrote "Some portions of the Sacramento and San Joaquin valleys are subject to bilious remittent and intermittent fevers during the autumnal months, but the general salubrity of California has justly become a proverb." The records of the old Spanish missions in California do not reveal the presence of fevers that may be suggestive of malaria and it is doubtful that the Spaniards brought this devastating disease into the State.

It must be remembered that white settlers began migrating to California even before 1830 and some few portions of the State were occupied by white pioneers long before the gold rush. It is possible that some of these early immigrants brought malaria with them, but there is no definite proof to establish the fact. It is certain, however, that malaria was present in California before the hectic days of '49, but none can say by what route it came.

The most important and certain sources of malaria in California are found in the enormous migration that came after the discovery of gold in 1848. The disease was dragged across the continent on the emigrant trains from the southern states, whence malaria in negro slaves had been brought from Africa many years before.

TABLE I

Army Posts in California—1849–1854

Northern California Army Posts

Presidio of San Francisco	
Benicia Barracks	Established April 30, 1849
Sonoma	
Camp Far West	Established 1849
Fort Reading	Established May, 1852
Fort Jones	
Fort Humboldt	

Southern California Army Posts

Fort Yuma	Established February, 1852
San Diego	
San Luis Rey	
Rancho del Chino (troops transferred to Rancho del Jurupa, September, 1852)	
Rancho del Jurupa	
Fort Tejon	
Presidio of Monterey	
Fort Miller	

Emigrants by sea who came to the El Dorado by way of Panama contracted malaria while on their journeys across the isthmus, bringing the disease up the coast to California. Thousands upon thousands of human beings poured into this favored region in the most stupendous migration that the world has ever seen. That malaria should come with them and that the interior valleys of the State should provide exceptional fields for the development of the disease constitute great penalties toward which we have paid vast tributes.

The first statistical record of malaria in California is that of the United States Army posts in northern and southern California during the six years 1849–1854. During this period 2420 cases of the disease

were reported by army surgeons attached to the 15 posts within the State. Of these 311 cases were reported from the San Joaquin Valley, the coastal region from Monterey to San Diego and the southern end of the State. The remaining 2109 cases were reported from the Sacramento Valley and the coastal region from San Francisco to Humboldt Bay. Of the total cases, 1540 were of the quotidian type (with paroxysms occurring daily); 581 tertian (with paroxysms occurring on alternate days); 11 quartan (with paroxysms occurring at intervals of two days); and 283 remittent (with paroxysms occurring at irregular intervals). There were three deaths from malaria in the northern posts during the six-year period. In 1853, during the third quarter of the year, the incidence of the disease ran as high as 816 cases per 1000 men in the northern California posts. During these six years, in the United States army, malaria was more prevalent only in Florida, Arkansas, Indian Territory and western Texas than in California.

TABLE II

Malaria Cases, by Type, Reported in Fourteen Army Camps of California, 1849–1853

	Southern	*Northern*	*Total*
Febris Intermittens Quotidiana	177	1363	1540
Febris Intermittens Tertiana	85	496	581
Febris Intermittent Quartana	5	11	16
Febris Remittens	44	239	283
Totals	311	2109	2420

In reporting to the Surgeon General of the Army, the surgeon attached to the post at San Diego in 1852 stated that the Indians "in some *particular places*" suffer from intermittent and bilious fevers, of which many died; but in this immediate vicinity a case of intermittent or remittent fever is seldom ever seen, unless contracted elsewhere." In 1852 the surgeon stationed at Monterey reported "Although now and then intermittents are met with here, yet in every instance, according to my experience, they are found among recruits, who have contracted the disease elsewhere, or miners, who have been living in the valleys of the Sacramento and the San Joaquin, where the disease prevails extensively, and who have come here for the benefit of their health. Off from the coast, as far interior as the Salinas River, a few cases are met with, but I have never known a case of intermittent fever *originating* in Monterey."

TABLE III

Malaria Cases Reported in Proportion to Mean Strength by Quarter Years Northern and Southern California Army Posts, 1849–1854

Seven Southern California Army Posts

1849	1 in 35	17 in 247	3 in 103	2 in 144
1850	17 in 266	13 in 200	13 in 222	4 in 211
1851	6 in 250	14 in 151	9 in 192	3 in 161
1852	54 in 534	23 in 589	38 in 422	18 in 432
1854	4 in 418	7 in 387	11 in 287	8 in 320
1854	3 in 241	15 in 269	21 in 365	7 in 382
Total	85 in 1744	89 in 1843	95 in 1591	42 in 1650

Seven Northern California Army Posts

1849	0 in 44	0 in 107	0 in ----	81 in 274
1850	50 in 238	22 in 72	10 in 69	91 in 207
1851	27 in 170	38 in 207	115 in 264	63 in 128
1852	56 in 252	61 in 320	391 in 833	140 in 466
1853	99 in 530	115 in 351	151 in 185	169 in 273
1854	90 in 284	141 in 417	121 in 348	78 in 358
Total	322 in 1518	377 in 1474	788 in 1699	622 in 1706

The surgeon at Fort Miller, on the San Joaquin River, reported "Diarrhoea, which, next to remittent fever in a mild form, is most frequently met with, seems to be produced by the great heat and sudden changes of temperature, together with faulty diet."

The surgeon at Benicia Barracks reported in 1852: "The majority of cases of fever may be traced to field service, in the valleys of the San Joaquin and Sacramento. Every summer, since the establishment of the post (April 30, 1849), some of the troops of the garrison have been engaged in field service in the upper country; the men have invariably returned (particularly from the Sacramento Valley) prostrated by fevers, dysentery, and scurvy; the fevers are not severe, the remittent form being mild and easily managed; the intermittent is apt to return frequently, and continue for a long time."

From Camp Far West, thirty-five miles north of Sacramento, the surgeon reported in 1849: "In common with the whole Sacramento Valley, this post is very sickly from June till October. Although there are no marshes within twenty-five miles of the post, it is considered one of the most unhealthy points of the valley." This post was abandoned on account of its unhealthiness and the troops were removed to Fort Reading, which was established in May, 1852. The surgeon stationed there reported in 1855: "The intermittent fever occurs here at all seasons. A violent attack of tertian intermittent occurred in an officer late in December last, just after fifteen successive mornings of white frost. A light shower followed the last frost, which was, in turn, followed by four frosty mornings, and on the second day of the last he was attacked. He arrived here for the first time seventeen days before his illness, and there is no reason to believe that he had contracted the disease elsewhere. The disease is perfectly controllable by the sulphate of quinine." In a foot note below the report for Fort Reading, the following appears:

"Assistant Surgeon John Campbell reports that in September, 1853, a company of infantry left this post for duty in the field, but the men were so debilitated by their residence in that locality, and by frequent attacks of intermittent fever, that they were unable to proceed to the seat of Indian difficulties, and had to halt thirty miles from the fort. A comparison of the statistics of diseases at Fort Reading with the abstract for all the posts in northern California shows that *one-half* of the entire number of cases of inter-

mittent fever reported occurred at this one place. The camp was abandoned on account of its unhealthiness in March, 1856."

TABLE IV

Malaria Cases Per 1000 Men in Northern and Southern California Army Posts, 1849–1854

	Southern	Northern
1849—First quarter	29	---
Second quarter	69	---
Third quarter	29	---
Fourth quarter	14	296
1850—First quarter	64	210
Second quarter	65	305
Third quarter	58	145
Fourth quarter	19	439
1851—First quarter	24	159
Second quarter	93	184
Third quarter	47	435
Fourth quarter	18	492
1852—First quarter	101	222
Second quarter	39	194
Third quarter	90	469
Fourth quarter	42	300
1853—First quarter	9	187
Second quarter	18	327
Third quarter	38	816
Fourth quarter	25	619
1854—First quarter	12	316
Second quarter	65	338
Third quarter	57	347
Fourth quarter	19	218

It becomes apparent, from these reports, that the geographical distribution of malaria in California in the early fifties was not vastly different from the geographical distribution of the few cases of the disease that occur in the State today. At the present time, in California, malaria has been reduced to a negligible status. In 1930 there were but 94 cases with 12 deaths, reported within the State, and many of these were imported from other states.

TYPHOID CARRIERS OF 1931

A total of 21 typhoid carriers has been found in California during the present year. Seventeen of these are casual carriers and four are convalescents, who continue to harbor the typhoid organism following recovery from attacks of the disease. Eleven of the 21 carriers were discovered by health officers of the various cities of California. Two were discovered by county health officers and the remaining eight carriers were discovered by the State Department of Public Health. A total of 40 cases of typhoid fever which occurred this year has been traced to these carriers. The largest number of cases for which a single carrier was responsible is eighteen. These occurred on a raw milk dairy route. The carrier was a milker on the dairy. Seven of these carriers are housewives; five are cooks and kitchen helpers. One is a food demonstrator and one is a practical nurse. All are under the supervision of the local health officer and have agreed to abide by the regulations which are designed to prevent the appearance of further cases in individuals with whom the carriers may come into contact.

RECOMMENDATIONS FOR PROPER SCHOOL VENTILATION

The New York Commission on Ventilation has been in existence for many years and as a result of its efforts considerable information relative to proper ventilation of school buildings has become available.

In a summary of its findings on school ventilation the Commission states:

"The evidence reviewed seems to indicate clearly the need of revision of existing laws and regulations which, if literally followed, would limit the ventilation of schoolhouses to the single system of mechanical ventilation. Furthermore, the Commission believes that the evidence unmistakably leads to the conclusion that the window-gravity method of ventilation for school classrooms (in the absence of specific local unfavorable conditions) is as satisfactory as the fan system and is generally more satisfactory.

The major objection of schoolroom ventilation is the provision of such atmospheric conditions as will facilitate the elimination of heat from the body surface without the production of objectionable drafts. In practice this means the maintenance of a room temperature of 68 degrees to 70 degrees Fahrenheit with moderate air movement. Under such conditions special control of humidity is not essential except perhaps in certain northern regions where humidity is exceedingly low in cold weather. A minor objective should be the provision of sufficient air change to avoid unpleasant body odors.

The avoidance of overheating is of primary and fundamental importance for the promotion of comfort and efficiency and the maintenance of resistance against disease.

Desirable conditions may be obtained by at least three methods of ventilation when proper design and operation is provided: (a) by plenum ventilation; (b) by local unit ventilation; (c) by window-gravity ventilation. For the average school, favorably located, window-gravity ventilation seems to be the method of choice on grounds of comfort and of economy.

Further investigations, in regard to the physiological effects of radiation and convection of heat, of vertical variation in temperature, and of electrical and other properties of the atmosphere, are greatly to be desired.

The present laws and regulations requiring a supply of 30 cubic feet of air per pupil per minute in the schoolroom have no justification in theory; and, in practice, may involve a serious handicap to progress in the art of school ventilation.

Such regulations should be replaced by laws outlining the major objectives of schoolroom ventilation and delegating to some small expert official body the power to determine whether specific plans for school ventilation are adequate to attain these objectives."

SAN FRANCISCO OFFICES MOVE

The offices of the California State Department of Public Health in San Francisco have been moved to the west wing of the third floor of the State Building, Civic Center. The new address is Room 358, State Building.

MORBIDITY *

Diphtheria

109 cases of diphtheria have been reported, as follows: Oakland 1, Fresno County 6, Fresno 2, Kern County 1, Los Angeles County 13, Alhambra 2, Burbank 1, Compton 4, Glendale 3, Inglewood 1, Long Beach 1, Los Angeles 33, Vernon 1, Lynwood 1, Hawthorne 1, Monterey Park 1, Maywood 1, Bell 1, Gardena 2, Orange County 2, Anaheim 1, Santa Ana 3, La Habra 1, Riverside County 1, Ontario 3, Redlands 2, San

* From reports received December 7th and 8th for week ending December 5th.

Diego 7, San Francisco 3, Redwood City 1, Sacramento County 1, Santa Barbara 1, Santa Clara 1, Sonoma County 1, Stanislaus County 3, Lindsay 1, Santa Paula 1.

Scarlet Fever

127 cases of scarlet fever have been reported, as follows: Berkeley 1, Oakland 1, Piedmont 1, Contra Costa County 4, Pittsburg 1, Fresno 3, Glenn County 1, Brawley 1, Hanford 1, Los Angeles County 8, Alhambra 3, Compton 2, Inglewood 2, Long Beach 3, Los Angeles 27, Redondo 1, Sierra Madre 1, South Pasadena 1, Whittier 1, Torrance 3, South Gate 1, Marin County 1, Orange County 1, Anaheim 1, Riverside County 4, Ontario 1, San Diego 5, San Francisco 5, San Joaquin County 7, San Luis Obispo 1, Santa Barbara County 9, Santa Barbara 4, Palo Alto 1, San Jose 3, Santa Cruz County 3, Modesto 1, Sutter County 2, Yuba City 1, Tulare County 7, Lindsay 1, Ventura County 1, Marysville 1.

Smallpox.

16 cases of smallpox have been reported, as follows: Coalinga 3, Hanford 10, San Francisco 3.

Measles.

187 cases of measles have been reported, as follows: Alameda 3, Albany 1, Berkeley 4, Piedmont 1, Fresno County 1, Humboldt County 58, Eureka 44, Kern County 1, Culver City 1, Glendale 1, Los Angeles 8, Bell 1, Sacramento County 1, Sacramento 44, San Francisco 7, Santa Barbara County 1, Los Gatos 5, San Jose 4, Santa Cruz County 1.

Typhoid Fever.

6 cases of typhoid fever have been reported, as follows: Sacramento County 1, Sacramento 1, San Francisco 1, San Joaquin County 1, San Mateo County 1, Santa Clara County 1.

Whooping Cough.

117 cases of whooping cough have been reported, as follows: Alameda 3, Berkeley 3, Oakland 5, Colusa County 2, Los Angeles County 1, Glendale 5, Long Beach 2, Los Angeles 18, Pasadena 3, San Gabriel 2, Orange County 2, Riverside 2, San Bernardino County 4, Ontario 4, San Diego 1, San Francisco 9, San Joaquin County 5, Stockton 9, Paso Robles 2, San Luis Obispo 7, Santa Barbara County 10, Santa Maria 3, Santa Clara County 2, Palo Alto 1, San Jose 1, Trinity County 7, Tuolumne County 1, Ventura County 3.

Epidemic Meningitis.

5 cases of epidemic meningitis have been reported, as follows: Los Angeles 1, San Francisco 2, San Jose 1, California 1.**

Poliomyelitis.

5 cases of poliomyelitis have been reported, as follows: Oakland 1, Fresno County 1, Sanger 1, Riverside 1, San Francisco 1.

Epidemic Encephalitis.

One case of epidemic encephalitis was reported from Laguna Beach.

Food Poisoning.

One case of food poisoning from Los Angeles was reported.

Tularemia.

One case of tularemia from Los Angeles County was reported.

Septic Sore Throat.

One case of septic sore throat from Oakland was reported.

** Cases charged to "California" represent patients ill before entering the State or those who contracted their illness traveling about the State throughout the incubation period of the disease. These cases are not chargeable to any one locality.

COMMUNICABLE DISEASE REPORTS

Disease	1931 Week ending Nov. 14	Nov. 21	Nov. 28	Reports for week ending Dec. 5 received by Dec. 8	1930 Week ending Nov. 15	Nov. 22	Nov. 29	Reports for week ending Dec. 6 received by Dec. 9
Actinomycosis	0	0	0	0	0	0	1	0
Anthrax	0	0	1	0	1	0	0	0
Chickenpox	285	279	245	290	188	285	240	345
Diphtheria	133	115	101	109	81	68	84	57
Dysentery (Amoebic)	0	1	4	2	0	0	1	0
Dysentery (Bacillary)	6	3	8	5	1	3	10	2
Encephalitis (Epidemic)	1	0	0	1	1	2	2	0
Erysipelas	15	13	16	16	12	12	13	7
Food Poisoning	0	0	5	1	0	0	10	0
German Measles	6	15	5	7	6	10	9	9
Gonococcus Infection	201	149	144	129	135	160	156	139
Hookworm	0	0	0	0	0	0	0	1
Influenza	44	73	42	69	27	31	50	63
Leprosy	0	0	0	0	0	0	1	0
Malaria	3	2	0	0	1	1	0	0
Measles	105	181	117	187	103	117	197	255
Meningitis (Epidemic)	4	4	5	5	3	5	4	8
Mumps	97	110	96	96	151	186	137	210
Ophthalmia Neonatorum	1	1	0	0	0	0	1	0
Paratyphoid Fever	2	6	1	1	1	1	0	0
Pellagra	1	1	1	1	2	0	5	2
Pneumonia (Lobar)	39	48	51	75	58	56	114	85
Poliomyelitis	5	5	3	5	44	27	28	12
Rabies (Animal)	11	9	6	6	12	13	35	16
Scarlet Fever	160	146	136	127	100	98	102	99
Septic Sore Throat	1	1	1	1	0	0	0	0
Smallpox	3	3	14	16	25	17	80	36
Syphilis	166	159	167	67	153	156	216	160
Tetanus	0	6	0	0	3	3	1	0
Trachoma	8	3	2	3	107	7	4	1
Trichinosis	0	1	1	0	0	1	0	0
Tuberculosis	186	173	184	136	177	184	155	194
Tularemia	0	0	0	1	0	0	0	0
Typhoid Fever	12	14	10	6	15	12	11	12
Undulant Fever	3	2	2	0	5	4	3	0
Whooping Cough	63	127	73	117	103	97	108	108
Totals	1,561	1,650	1,441	1,479	1,515	1,556	1,778	1,821

Influenza shows a very slight upward trend.

Smallpox is showing some activity.

Diphtheria is more prevalent than it was at the corresponding season of last year.

Scarlet fever is slightly above normal in its prevalence.

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